Texas Highways November, 1958 35c

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A Salute to Our Maintenance Men

Texas Highways

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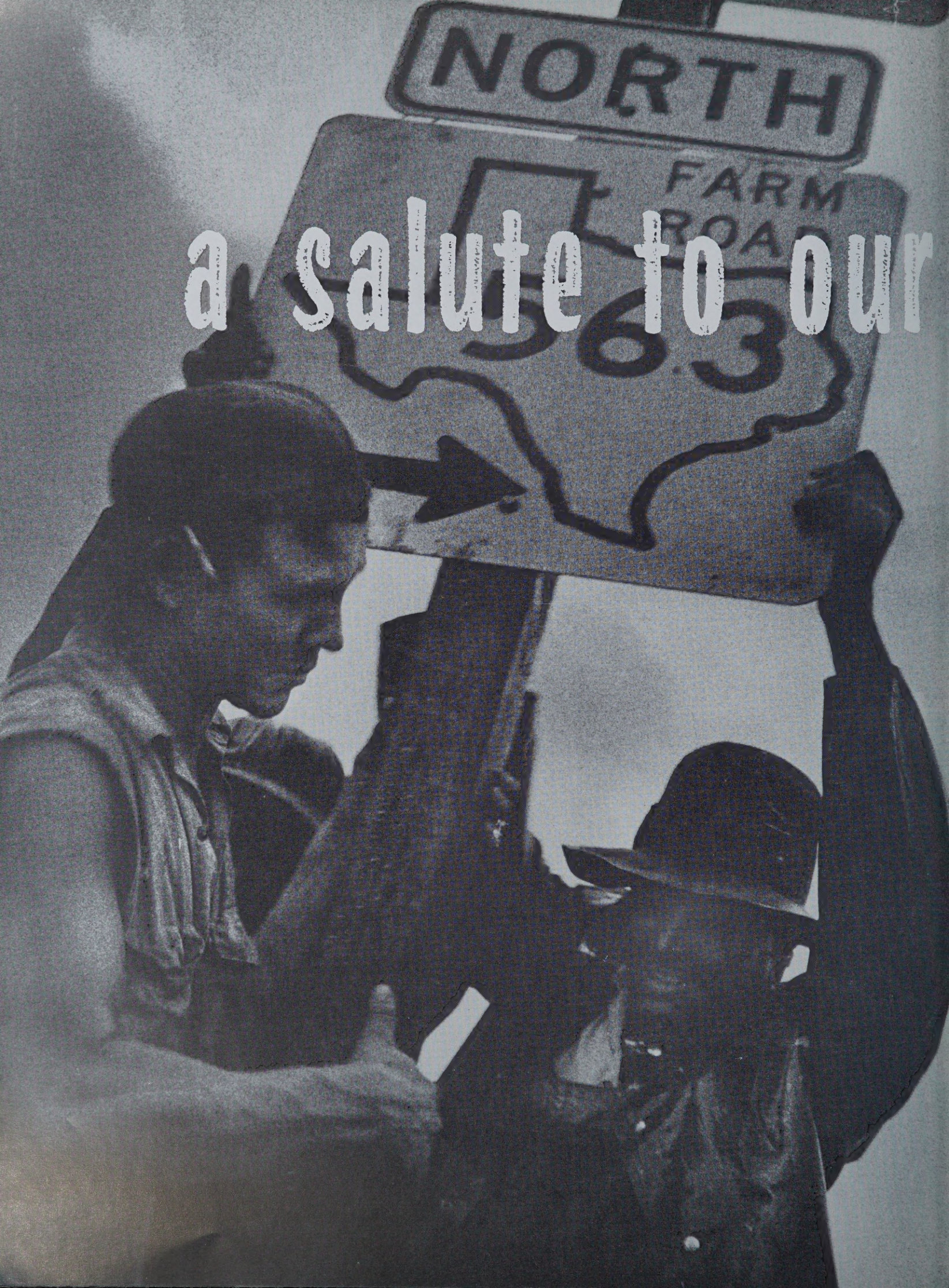
NORTH
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a salute to our

maintenance men

This month, TEXAS HIGHWAYS salutes the men who make our highways — the maintenance crews. These are the men who venture forth in good weather or bad to keep our roads open for travel. Good weather finds the maintenance men at their constant chores of patching highways, retopping, or widening them.

That old phrase, "inclement weather," means our maintenance men are out in the middle of it—come what will. No fair-weather friends these men. Snow storms of West Texas find them working around the clock clearing roads, sanding bridges, and helping stalled motorists. Floods are another trying time. Placing warning and detour signs, stopping traffic in flooded areas, pulling cars through water or mud, repairing bridges—theirs is a never-ending job. But the many letters from grateful motorists lauding our workers show that these men do their job cheerfully, politely, and considerately.

Other letters received express amazement at how hard our maintenance forces work. Some say that they have even stopped to watch them, working, as one writer put it, "as if they owned the business." In a way they do. Every Texan is part owner in our highway system—one of the finest in the nation—and these men who make them the finest have every right to be proud.

Highway Department employees number approximately 15,600, and of this number almost 50 per cent are maintenance men. TEXAS HIGHWAYS salutes these men.

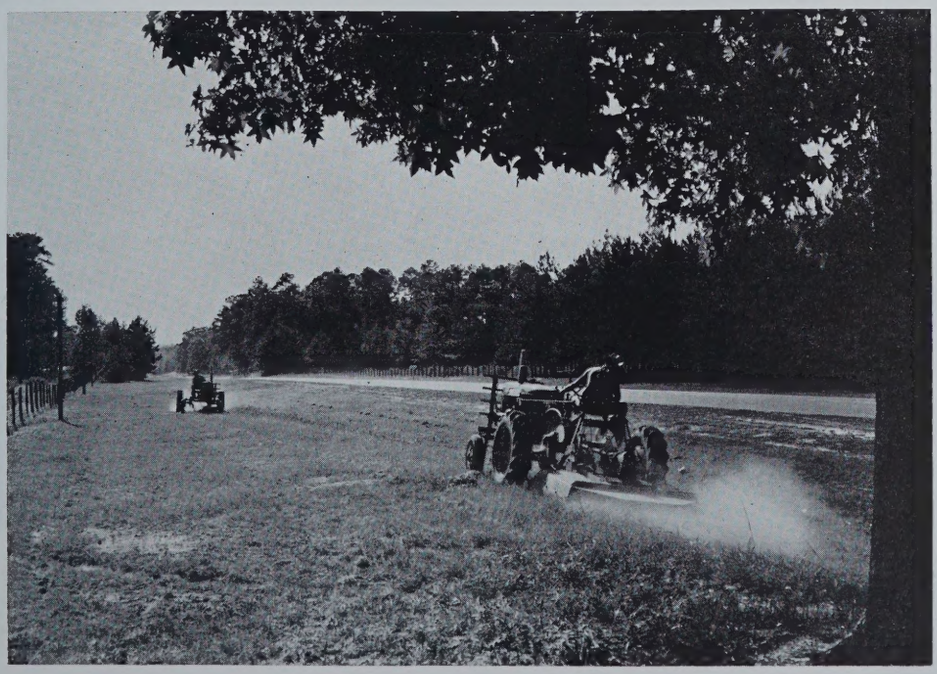
Luis Davila, Skilled Laborer, is shooting grade on a drainage ditch on U. S. 90A west of Stafford. Davila has 33 years of service with the Department.

Maintenance men lay paper strips at the end of a recently completed asphalt land to assure a neat joint for beginning of the next asphalt joint. These Hallettsville men are working on F. M. 340, just off U. S. 77A.

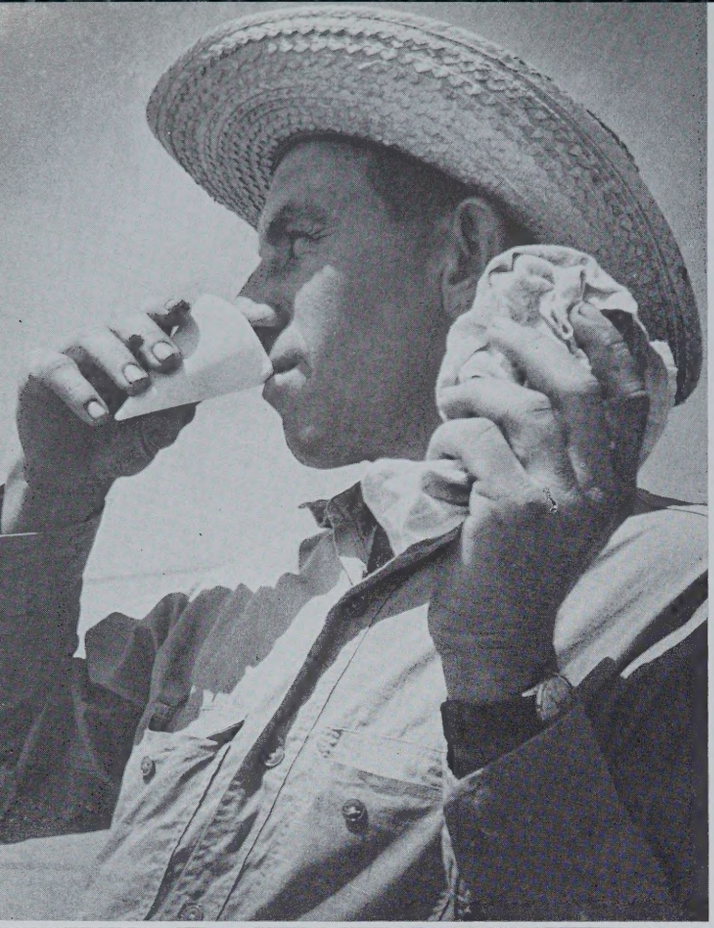
This maintenance worker from the Hallettsville warehouse sped by so fast while operating an asphalt spray mechanism that our photographer never had an opportunity to get his name. »

August Kubos, Semi-skilled Laborer, and Leroy Michalke, Skilled Laborer, of Hallettsville, broom gravel on F. M. 340, preparing it for surfacing with asphalt and pea gravel.

Replacing lamps in traffic signals are Semi-skilled Laborer Eldon Hickman, flagging, and left to right on the scaffold, Skilled Laborers Edward Kelly and Billy O. Rice, of the Greenwood section in Houston. The road is S. H. 146 in La Porte.



» *These men are cutting weeds and grass on the right of way along U. S. 190 between Livingston and Woodville.*



Under that hot Texas sun, water tastes good. James Roznovak, Semi-skilled Laborer at the Columbia warehouse, pauses on U. S. 90A east of Eagle Lake for a cool one.

Gilbert Pauliska, Skilled Laborer, Rosenberg warehouse, drives a maintainer grading a drainage ditch on U. S. 90A west of Stafford.

Shoveling fill material from a pickup beside the Gulf Freeway are E. W. Els and Glenn Brown, both of the electrical department of Greenwood warehouse, Houston. Washouts on shoulders caused by bad rains are being filled.

Bobby Norwine and Jimmy J. Puckett, employed at the Baytown Tunnel, clip weeds around trees planted on the right of way at the interchange of S. H. 146 and S. H. 225.

Painting posts on U. S. 90A east of Eagle Lake is Skilled Laborer H. O. Fredricks of the Columbia warehouse.

Senior Party Chief C. T. Poland, from the Resident Engineer's office in Conroe, shoots sight on fill in construction of new U. S. 75 just south of Conroe.

A maintenance crew from the Anahuac warehouse helps a motorist get back on the road on S. H. 61 north of Anahuac.

Cleaning silt out of gutters to ease the drainage problem during hard rains is a crew from the Anahuac warehouse. The site is S. H. 73 and F. M. 563 intersection.

New signs go up in all kinds of weather. Here, Elliot Peebles, Common Laborer, and George T. Witherspoon, Signman, hold the sign in place with a foot while Hosea Tarver and Frank Shields, Common Laborers, push the sign up at S. H. 73-F. M. 63 intersection. All are of the Anahuac warehouse.

Award of Honor goes to district 21

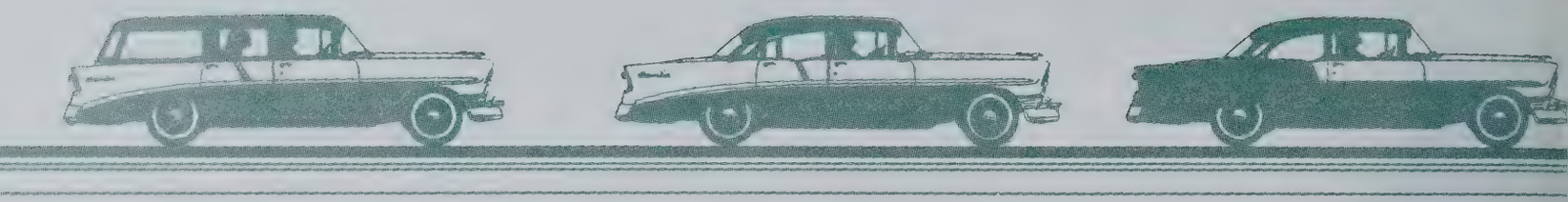
A succession of accident-free days which stretched to the noteworthy length of nearly two years caught the eye of the National Safety Council when it was handing out its top awards.

The Texas Highway Department's District 21 qualified for the Award of Honor because of its 2,341,599 injury-free man-hours, according to Ned H. Dearborn, president of the National Safety Council. This award is presented only where an establishment's record satisfies the rigid safety requirements laid down in the Council's Award Plan.

On June 25, Robert E. Lindsey, Director of the Insurance Division, presented the award to District Engineer J. F. Snyder on behalf of the National Safety Council. The presentation was made at a District-wide safety meeting at Pharr, which was attended by employees of the District receiving Safe Truck Driver Awards and Certificates of Service.

Lindsey was principal speaker at the meeting, and congratulated the district on its safety record.

District Engineer J. F. Snyder accepts the Award of Honor plaque from R. E. Lindsey, Director of Insurance Division, Austin. Lindsey, acting in behalf of the Safety Council, made the presentation.



Improvement of

Hubert Fields, Senior Maintenance Foreman
District 7

The traveling public is not concerned with whether a road is constructed of concrete, single, double, or triple asphalt surface—or any of the other surfacing materials. It is primarily concerned with traveling in comfort and safety. Therefore, as public employees, our prime responsibility should be in so far as possible to satisfy the demands of our employers.

Our roads are constantly moving, so to speak. The surface of the earth expands and contracts depending upon conditions of heat and moisture, and various types of soils behave differently. Many things contribute to surface movement, poor riding qualities, and deterioration of pavements. A few of these are: (1) unsatisfactory subgrade material and improperly constructed subgrade; (2) inferior-quality base materials and improper compaction; (3) constant increase of heavy traffic over inadequate bases; (4) insufficient compaction of backfill at drainage structures; (5) poor drainage; (6) adverse weather conditions, and many others too numerous to mention.

We shall not spend time discussing these various contributing factors, but it is imperative that those such as poor drainage and inferior quality bases and subbases be corrected before we can be assured of restoring and maintaining the original degree of smoothness in a pavement. Painting over a rough board will not secure a smooth surface.

Surface cracking in asphalt pavements represents a large portion of pavement deterioration encountered, so I will discuss methods of repair that have proven fairly successful in District 7.

We normally encounter three types of surface cracks—singular, large openings which are usually, but not always at right angles to the center line of the roadway; checkerboard type, both large and small checks; and sectional which usually, but not always, run parallel to the center line. I mention these specific types because a different mixture of material is used in making repairs, depending somewhat upon the size of the opening.

In the past we have used R.O. 3, RC-2, and MC-3 asphalts, but due to its all-purpose use for road mix, edge repairs, and available storage facilities, we have decided almost entirely in favor of MC-3 cutback asphalt.

Experience has shown that diluting with kerosene at a ratio varying from 20 per cent to 40 per cent by volume, depending upon the size of cracks or openings, obtains the best results. The MC-3 should be diluted only enough to assure that the material will work readily into the opening.

Pouring containers can be secured from stock, and the opening can be reduced to the desired size. Also, small asphalt pots with hand-spray nozzle attachments are used. An improvised nozzle can be made by brazing the original opening and drilling a new one of the desired size. Both methods have proven satisfactory.

After depositing the material into the cracks in the pavement, it is worked into them with a squeegee made of a piece of rubber belting or similar material twelve to eighteen inches in length secured to a handle attachment by a piece of split three-fourths-inch pipe. After the asphaltic material has been worked or pushed into the cracks, sand or a similar material is spread on with scoops to blot or absorb the surplus asphalt. When the asphaltic material has been absorbed, the sand is removed from the surface.

This method of using a squeegee prior to applying the blotting material applies only to a relatively smooth surface. On surfaces that are nonskid and rough in texture, the asphaltic material and sand are applied prior to the squeegee operation, after which the surplus is removed from the surface.

A certain amount of temporary pavement discoloration will result from the above methods, but weathering and time will cause the discolored area to blend in with the surrounding surface. This method of surface repair is accomplished without any building up of the repaired area which would create an undesirable riding quality. At the same time a quantity of asphalt has been deposited down in the crack where it is needed most. This method is certainly not a cure-all in any sense of the word, but it does surpass any that we

*Speech presented at the Thirty-second Short Course.

Riding Qualities*

have tried, since spot sealing not only leaves an unsightly condition, but creates a poor riding surface and does not put as much asphalt into the area as needed.

We use the squeegee method on surfaces just prior to seal-coating operations to seal openings that would subsequently appear through the seal coat shortly after completion of the operation. Too, by removing or blotting the surplus asphalt, chances of spot bleeding in the new seal coat are decreased.

Since cool weather causes the cracks to open more than warm weather, we constantly keep a crew on this type of work during the cooler months, weather permitting.

As mentioned, this is not a complete solution to the problem, but it is economical since the cost of materials and equipment is slight and the labor of only five to seven men is involved, and if constantly used will produce satisfactory results.

Next, let us discuss spot leveling of surface areas to improve riding qualities. The areas in need of leveling are located by driving over the road at various speeds, sometimes accompanied by the employee in charge of the group who performs the leveling operation. The area in need of improvement is marked for future identification by noting the station number—or in most cases simply painting an "X" on the surface with emulsion or center-stripe paint. Painted identification is better since it locates the spot exactly. It also remains visible for a long period of time. Low points on structure approaches are more easily located, however, riding over them at varying speeds. Observing other traffic will also aid in their location.

The leveling or balancing crew uses a length of heavy nylon cord to stretch over the marked area, letting it extend several feet on either side of the depression. Beginning at the pavement edge, the tightly stretched cord is moved parallel to the center line in approximately two-foot increments. As the depression shows under the string line, its outline is marked using either emulsion or carpenters chalk. The former is of a more permanent nature and will remain visible should the operation be delayed for some reason.

After the depressed area or contour has been outlined, emulsified asphalt (EA-HVMS), which has been diluted with water at the ratio of around 40 or 50 to one—depending on the density of the surface for application—is applied as a tack coat. This tack coat can be applied with small hand containers and spread evenly with a broom, or a small asphalt pot with spray attachment can be used. In the event this latter method is used, a certain amount of hand work with a broom is required around the edges to assure a good application. The emulsion is then allowed to break, after which asphaltic concrete or mix is applied.

For leveling the mix, we use a shop-built, hand-powered device designed by Jim Butler, Senior Maintenance Foreman at Sterling City, and a commercial-type level lute. The device designed by Butler is composed of a five-foot length of grader blade mounted on two 8 by 1.75 wheels and two handles. The wheels are completely swiveled so that the movement, if desired, can be in a circular direction with a blade-like motion.

After the material has been shaped properly, it then receives pneumatic rolling, which is normally done with a truck, and then rechecked by string line for irregularities. After any irregularities have been corrected, it is given a final pneumatic rolling, then rolled with a flat-wheel roller and dusted with asphalt screenings. The asphalt screenings are applied sparingly and tend to fill in voids and provide a sealing effect.

The desired purpose is to have a completely balanced section or area that can be ridden over without the realization that any irregularity ever existed. Spot leveling of this type is done on all roads, but before a seal coat is applied to any section, it is gone over closely to remove any irregularities that would produce undesirable riding qualities.

Larger areas that have unbalanced sections, or corrugated surfaces, can be efficiently worked using an asphalt pot of 400- to 600-gallon capacity with spray-bar attachment, a drag-type spreader box for asphalt mix,

and a small blade of the type used for blading shoulders. As in the above method, a tack coat of emulsified asphalt is applied, but in this case a small asphalt pot and spray bars are utilized and the proper amount of asphalt mix is applied using the spreader box. Pneumatic rolling of the material is begun as soon as the blade can distribute a small amount over the tack coat, and continues until all material is in place. Upon completion of pneumatic rolling, the surface is rolled with a flat-wheel roller and asphalt screenings applied.

Blade mix, or road mix, as it is sometimes referred to, is another means of alleviating undesirable riding conditions on corrugated surfaces, slick surfaces, and unbalanced sections. This method is normally used on relatively long sections of roadway and the result is a suitable nonskid surface that gives good riding qualities.

Aggregate for this operation is usually of the following gradation:

Retained on ½-inch screen	0%
Retained on ¼-inch screen	35- 55%
Retained on 10-mesh sieve	70- 85%
Retained on 20-mesh sieve	90-100%

Note that the above gradation provides for a large amount of fine material which tends to decrease the per cent of voids and increase the density of the mix.

MC-3 asphalt is used at the rate of 14 to 20 gallons per cubic yard of aggregate, the rate of application depending upon the percentage of fine material in the aggregate and upon the condition of the surface to which the mix is applied. If too much asphalt is used, a slick surface will result. If an insufficient amount is applied, the surface will tend to ravel, so close observance is imperative if satisfactory results are to be obtained. It should be pointed out that favorable weather conditions such as warm sunshine are mandatory for this type of operation.

The aggregate is applied on the road with a drag-type spreader box at the rate of four to five cubic yards per station for a roadway width of 24 feet. This rate of application will normally suffice; however, this depends upon the condition of the pavement to be repaired. Usually four cubic yards per station is the minimum amount that can be used and get ample uniform coverage, whereas approximately five and one-half cubic yards is the maximum amount which can be manipulated efficiently. If the condition of the pavement is such that an amount in excess of five and one-half cubic yards is required to obtain satisfactory results, it should be applied in two courses. Normally a roadway length of four to five thousand feet can be readily handled; however, the supply point and distribution of asphalt will be a controlling factor.

Two maintainers are required to manipulate and dry the aggregate. After the aggregate is completely free of surface moisture, it is uniformly spread in a ten- or twelve-foot width. Approximately one-half of the required amount of asphalt is applied with a distributor. A thorough mixing of the material is accomplished using the maintainers or blades, after which the remaining quantity of asphalt is applied. Upon completion of the second mixing operation, the material is bladed and broomed with a rotary broom to one lane of the pavement. The cleaned surface is given a tack coat of MC-3 asphalt at the rate of .05 to .08 gallon per square yard, depending upon the porosity of the surface. The material is then transferred to this lane and the tack coat applied to the other.

The roadway is now ready for the material to be uniformly distributed in thin layers and rolled with a pneumatic roller. A pneumatic is more satisfactory since it will not bridge over high points. It is necessary that a string line be set prior to the beginning of the laying operation to maintain a straight edge. One of the blades must have an edging shoe attached, and it uses a small roll of material left by the first blade for edging purposes. Occasionally a small amount of uneven material will appear on the edges during the final blading. This small quantity should be wasted rather than attempt to utilize it on the surface, as the result will be ridges on the finished surface.

Upon completion of blading and pneumatic rolling, either dry aggregate of the same gradation for the mix or asphalt screenings are applied in very small quantities to the surface, using a regular spreader box. This application is sometimes referred to as salt and pepper. It prevents the flat-wheel roller—the next operation—from picking up the material. Asphalt screenings, if available, are better than regular dry aggregate since they tend to produce a much better sealing effect.

Occasionally water is used on the wheels of the flat-wheel roller prior to applying the aggregate. Rubber tires on all equipment should be mopped with kerosene to prevent material being picked up. Too, smooth-surface tires on the pneumatic roller are more desirable than the ribbed variety.

This type of surface treatment will progress rapidly and satisfactorily if properly organized. It is necessary that application of aggregate on the next section, blading, mixing, and application of tack coat be carried on simultaneously.

Frequently it may be necessary to sprinkle the shoulders to reduce the dust hazard to the traveling public and employees, and to prevent damage to the tack coat. In the event of rain, the material is simply windrowed in the center of the pavement until favorable weather prevails. This might require that more asphalt or a small amount of kerosene be added to obtain proper workability of the mix.

The methods mentioned have all been used in District 7 to improve riding qualities with a fair measure of success. However, on each and every asphalt job something new is learned and very seldom are two jobs exactly alike. We have no definite pattern we can follow, but must exercise continuous observance to improve riding qualities so that the traveling public can say "we are riding smoothly."

Fuel servicing UNITS

J. K. Nash, Senior Equipment Supervisor
District 14

Proper lubrication and servicing of equipment in the field, both for maintenance and special jobs, is the most important part in preventive maintenance of equipment. Power grease guns and dispensing equipment make equipment servicing comparatively simple and insure a more thorough job.

The welding shop in this District has constructed four grease- and fuel-servicing units, mostly from salvage material, and built to suit the maintenance or construction crews using them. All four units were constructed on the same general pattern.

The fuel tank is divided into three compartments—for gasoline, diesel fuel, and kerosene. Size of the compartments vary to suit the needs of the individual crews. The dimensions of the entire tank are such that approximately 1,100 gallons of liquid can be stored.

Diesel fuel and kerosene are dispensed by hand pumps. Gasoline is dispensed by an air-operated pump through a meter controlled at the nozzle of the hose. The gasoline-flow meter gives an accurate measure of the fuel dispensed.

Air is furnished by an air compressor mounted behind the cab. This compressor is powered by take-off by belts from a jackshaft. The air tank is made from double-strength, ten-inch pipe fitted with a 150-pound pressure relief valve. This air pressure permits the use of all air-operated equipment at the same time.

These servicing units are also equipped with a jib-type boom fitted with a chain hoist to permit the easy loading of oil barrels, heavy equipment tires, and other material too heavy for hand loading.

Ample storage space is provided under the edge of the truck body for flares, tools, and other supplies. These servicing units are constructed so that the entire unit may be removed from the truck chassis by unbolting it from the frame and power take-off, and used on any other truck of the same wheel base.

The cost of these servicing units is about one-third that of a manufactured unit and is more desirable because it is tailored to fit the needs of a given crew. Units of this type are recommended for special jobs and heavy-maintenance crews.

Temporary

Repair May Be Permanent

Edward L. Sanders Jr., District Maintenance Engineer
District 22

The Nueces River, sometimes dry, sometimes a rampant Southwest Texas stream, when swollen by heavy rains in June, 1958, brought serious damage to several highways in District 22.

One of those affected, F. M. 1025—an important road serving a large commercial farming area in Zavala County—was closed at the Nueces River Spillway Bridge. This structure, consisting of one 50-foot continuous slab unit, was erected in 1948 by the Jack Freeland Company for the Zavala-Dimmit County Water Improvement District 1.

A four-inch deflection appeared in the slab when the seven-foot by seven-foot spread footings of bent Number 4 were undermined by the swift stream. Inspection of the structure revealed that the 80-foot continuous slab unit was supporting virtually the entire weight of the footings, columns, and cap. To extend the columns and footing in the deep running water would have been very costly, so other means of repair were sought.

After consulting with J. A. Shelby, Maintenance Engineer from Maintenance Operations Division, and Fred W. Clark Jr., Senior Resident Engineer at Carrizo Springs, four twelve-inch H-piling were driven. Only 78 feet of piling were used on the job, with an average of 52 tons bearing obtained on each of the four piling. We were fortunate in that a pile-driving rig belonging to Guy Shinn was working in the vicinity. Shinn did the pile-driving work for us at a nominal cost.

Two salvaged 27-inch by 90-pound I-beams were placed on top of the piling. The beams were prepared and spliced by the Crystal City Machine Shop. After these beams were welded into position, short lengths of 10-inch by 25-pound I-beams were framed between them under the cap. Hydraulic jacks were placed on these ten-inch I-beams and the slab was quickly returned to its original position. To complete the work, the jacks were replaced with vertical sections of eight-inch I-beams.

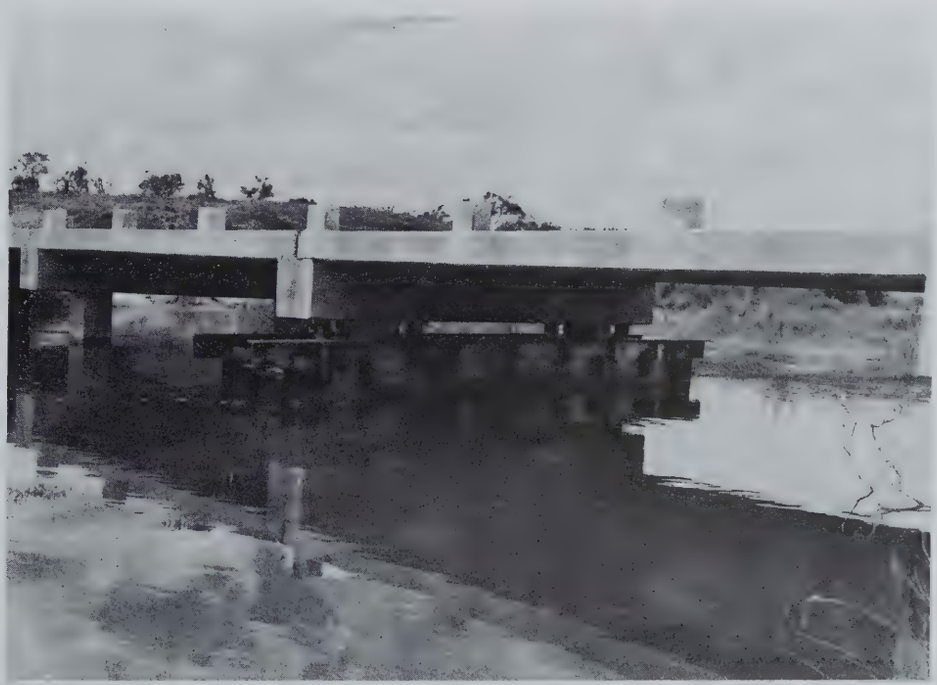
The structure is now open to all legal loads.

This four-inch deflection is a result of undermined bent during heavy rains.

Pile-driving operations.

Salvaged I-beams are placed on piling.

Piling cut off and capped.



Repairs are completed, and bridge is open.

The Importance of

With the increasing number of complaints from the traveling public on this subject, this is a very timely article. I recommend that it be read and seriously studied by all maintenance personnel.

J. A. Waller
Chief Engineer of Maintenance Operations

Somewhere in Texas right now, a sparkling late-model automobile is moving down an F. M. road, traveling at a conservative speed. The driver notices a small amount of road work going on. No other cars are on the highway. Suddenly he sees in his rear-view mirror a cloud of dust welling up. The cloud proves to be a contractor's truck tearing toward him loaded to the brim with gravel. The truck whizzes by the automobile. Immediately, the driver of the car is blinded by flying gravel. His windshield is chipped, and paint is knocked from the front and sides of his car.

Elsewhere in the state, the driver of another car is moving along at a legal speed, enjoying the drive while carefully watching the road ahead. Suddenly, he turns a bend, immediately sees a warning sign, and just as quickly must slam on his brakes to avoid plowing into a road-repair crew.

These incidents, although bearing no definite names and locations are characteristic of events that happen every month of the year. Countless cards and letters are received from motorists who have experienced these and other difficulties. Quite often they are the fault of road-repair crews and highway contractors.

Safety on the highways is a much-discussed subject—one which should not be restricted entirely to motorists driving private passenger cars. Just as important as the courtesies one motorist shows to another are those our contractors and maintenance crews show to their own crews and the passing motorists. A little precaution can do so much good, not only for highway safety, but for good will on the part of the public toward roadway workers.

Most complaints aired in letters received from the traveling public are frequently the result of thoughtlessness on our part. The motorist using the highway is traveling over surfaces that he has helped pay for, and public good will is an extremely important factor in assuring that the highway program will have the support of the taxpayer. All courtesies extended to the passing motorist help insure his continued backing of, and enthusiasm for, good highways.

Flying gravel, both from gravel-loaded trucks and that thrown up by truck tires, is the cause of many complaints from motorists. Damaged windshields are caused, in most instances, from two oversights on the part of truck drivers. Their speed may be too great, or their trucks are not equipped with adequate flaps on the rear wheels. Excessive speed will cause gravel to fly from loaded trucks, bombarding following automobiles. Without flaps—which are required by law—the rear wheels of such vehicles will cause rocks and gravel to be shot from the road onto windshields, fender, and hoods. Installation of adequate flaps will greatly reduce this danger.

In areas of major construction, the problem of flying gravel is only incident to the difficulties of motorists being mixed with highway equipment. In many instances, it is mandatory that traffic be maintained through construction areas. If not handled properly, the traffic can become a real threat to the safety of motorist and workman alike. A system that is coming to be widely used in areas of heavy construction is the convoy. One-way traffic is allowed periodically in both directions, conducted through by a member of the construction crew. The convoy system provides many answers to construction area problems.

In areas where the traffic count is not great enough to justify the use of a convoy-guidance truck or crew, one or two flagmen, if properly apprised of their responsibilities, can greatly reduce traffic hazards. There is no law that states a flagman *must* be provided in all cases. But it is imperative that resident engineers and highway foremen use good judgment in providing as many flagmen as are necessary to guarantee the safety of motorist and worker.

Flagmen should have a thorough knowledge of their duties to passing traffic and roadway crews. They should be provided with the pamphlet "Instructions to Flagmen," published by the Department. We have

Highway Safety

received reports from motorists who were unable to interpret the signals of flagmen. The flagging pamphlet describes in detail all procedures which the flagman will be called upon to use. His courtesy to motorists is of utmost importance. For best results, a man should be selected for the flagging job who has a pleasing manner and neat appearance. Use of the "Please Drive Carefully" slip for distribution by the flagman to motorists calling upon them to be especially careful while proceeding through areas of construction has proved a big help.

Complaints are continually received against the poor usage of advance warning signs and barricades. In many instances, there may be no warning, or the warning may be placed immediately adjacent to the construction area. The motorist does not have enough advance notice to allow him to reduce his speed and cast a wary eye about for highway equipment in the area. Regulations for the placement of advance warnings and barricades are fully explained in Section H of the "Texas Manual on Traffic Control Devices for Streets and Highways." Every resident engineer and highway foreman should be aware of these regulations and enforce them to the letter. He must afford protection to both the motorist and his own workman.

No matter how brief the job, nor how small the area under construction or repair, the contractor or foreman should take the time to provide all necessary barricades and flagmen. Responsibility for the safety of motorist and workman will rest upon proper warnings.

As important as the placement of proper warnings and barricades is the erection and removal of temporary speed-limit signs. There are frequent letters from motorists who have come upon a speed-reduction sign in anticipation of a construction area. Often after the area has been passed, there is no indication to resume speed. Also, there are instances where construction or repair has been completed, workmen and machinery have departed, but the speed-reduction signs remain.

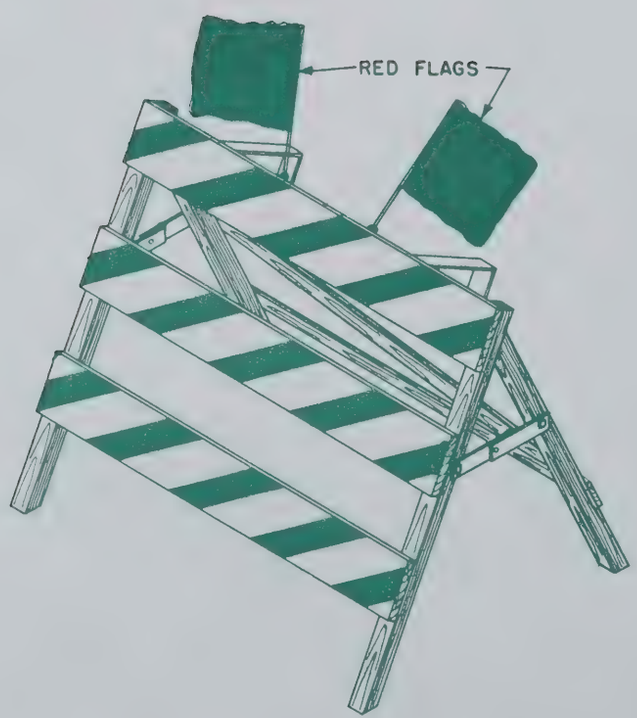
Finally, a contractor or highway foreman should bear in mind the requirements of local traffic when scheduling his sequence of work. All possible steps should be taken to insure that traffic will be able to continue with the least possible interruption while work is in progress. He must schedule his work where both the interests of the motorist and those of his own project are served to the greatest advantage.

By no means are the dozens of letters we receive always of a condemning nature. Consistently, motorists will write to us expressing their pleasure in our work on Texas highways. They feel we are doing a good job. Therefore, when we do receive letters relating an unpleasant incident, we should take it as advice from our customers. By heeding their advice, our service will improve, and greater progress can be made.

It is most important that we take

SLOW
PLEASE DRIVE CAREFULLY
You are entering a section of highway under construction.
Please do not pass the car ahead.
WATCH FOR . . .
Uncovered Asphalt
Flying Stone
We are performing this work under traffic to prevent you from traveling additional miles on a detour.
The inconvenience is regrettable, but in order to save you, the taxpayer, time and money, we have chosen this type of repair over costlier methods.
Thank You
TEXAS HIGHWAY DEPARTMENT

BARRICADE "H"



BARRICADE "G"

into account the safety and convenience of the motoring public while seeing a highway project through to completion. It is a duty which goes along with the job. With forethought in planning, careful attention to equipment and men, with a cocked eyebrow toward the motorist and his needs, the highway program will continue to have the backing and good will of a public whose need for more and better roads continues to grow.

The following letters offer a sampling of those received almost daily in the main office.

Dear Mr. Greer:

I have lost five windshields in the last four years on account of the Highway Department using the public's automobiles to pack pea gravel and crushed rock on highways under construction and being repaired in Texas. Three of the windshields were on Cadillac automobiles and within less than a year. One was on a Chrysler New Yorker and the fifth on another Chrysler.

On a recent trip between Bastrop and San Marcos, I was most agreeably surprised on coming up to a section of road under repair to see traffic stopped until a convoy truck could take a group of cars over the section under repair at speeds that make it impossible to ruin the paint and break the windshields on the cars. The courteous signs on the back of the convoy trucks were another thing that was gratifying to see. I want to commend the State Highway Department for at last taking some steps to cut down on the useless expense of countless thousands of dollars to insurance companies and premium payers.

I know practically no one who has to get out on the highways of Texas who has not had the regrettable experience of having the paint chipped all over the front end of his car, and having, if not a completely wrecked windshield, one that is unsightly due to chips and breaks caused by flying gravel.

I think the attached slip given me on the particular trip I mentioned is a wonderful idea, and I sincerely hope that the Highway Department contemplates making it their usual practice to convoy cars through areas where loose gravel and fresh tar are being applied. I and countless thousands of other motorists in Texas will be grateful to see an expansion of the convoy plan, and while a lot of people will not take the trouble to thank you, there are a lot of us who will certainly make our gratitude known.

Herschel J. Wood
Houston, Texas

Dear Mr. Wood:

We were pleased to receive your remarks relative to the problem of flying stone in our construction and maintenance projects. It has always been our policy to take every precaution to insure the safety and comfort of the traveling public. However, in spite of our precautionary measures, we realize that the element of risk and damage to vehicles traveling through these projects can never be completely eliminated.

You might be interested to know, in our effort to hold damage to vehicles to a minimum, we initiated the guide vehicles with the sign which you mentioned in your letter. These guide vehicles are used for handling one-way traffic in construction projects which warrant and justify this method of routing traffic. In addition to the small yellow "Please Drive Carefully" slip you were given, we also publish the attached "Instructions to Flagmen" pamphlet which is designed to instruct and teach our flagmen the proper method for flagging and handling traffic.

We certainly appreciate your kind expression regarding our method of handling traffic with the guide vehicles, and you may rest assured that we shall continue to do everything possible to hold the damage to vehicles traveling through construction areas to an absolute minimum.

D. C. Greer
State Highway Engineer

I know that you are a busy man as I am so I will make this letter as short as possible. This morning I was traveling along—here in—when I was passed (met by) a Texas Highway Department asphalt truck, license number —, and my car was covered by strings of asphalt coming from a pipe in the truck which was not completely closed. I followed the truck to its work in—where it was spreading asphalt for a city street and talked with the driver. He said the Highway Department had no insurance for such things. My car has a new paint job which cost $135 and it cost $29 to have the asphalt hand rubbed out, as cleansers will take off new paint. There are spots which will have to be painted and I'm not asking the insurance company to pay for any more of the State's damage. Last month my car was scratched up by a Highway truck and the paint job was necessary because the paint couldn't be matched. I want to be reimbursed for the $29 or I'll see what I can do about it myself. All consideration on your part will be appreciated.

(Signed)

After much patching of Highway—between—and—, there was a recent combination of asphalt-rock covering put over the entire south-north portion of the dual highway.

For the past three weeks the heat has brought the base oil and tars to the surface. This has resulted in your Department putting loose pea-gravel on top of the tar on a DAILY basis during this period.

I travel this road every day to my job and every Saturday to take my son to a doctor. During the past three weeks I have been constantly bombarded with flying stones. In this weather you can't ride with your windows closed.

My son was hit on the arm twice a week ago last Saturday and just dodged a rock in the face. I have been hit three times; once on the cheek by a very small and glancing rock which stung more than hurt. Several persons riding in our car pool have been hit. One rock went through the auto at such speed that it scarred the inside of the rear glass. This is extremely dangerous, especially to a person's eye. The State will certainly be faced with suit for serious damage.

Also the pitting of my windshield and paint on my hood is as if I had been in a sandstorm. This damage has certainly devaluated my automobile.

This method of paving roads may be economical until faced by heavy damages, but it is not economical to the motorist nor is it in keeping with the usual high standards practiced in installing and maintaining Texas highways.

(Signed)

REMODELING SECTION WAREHOUSE

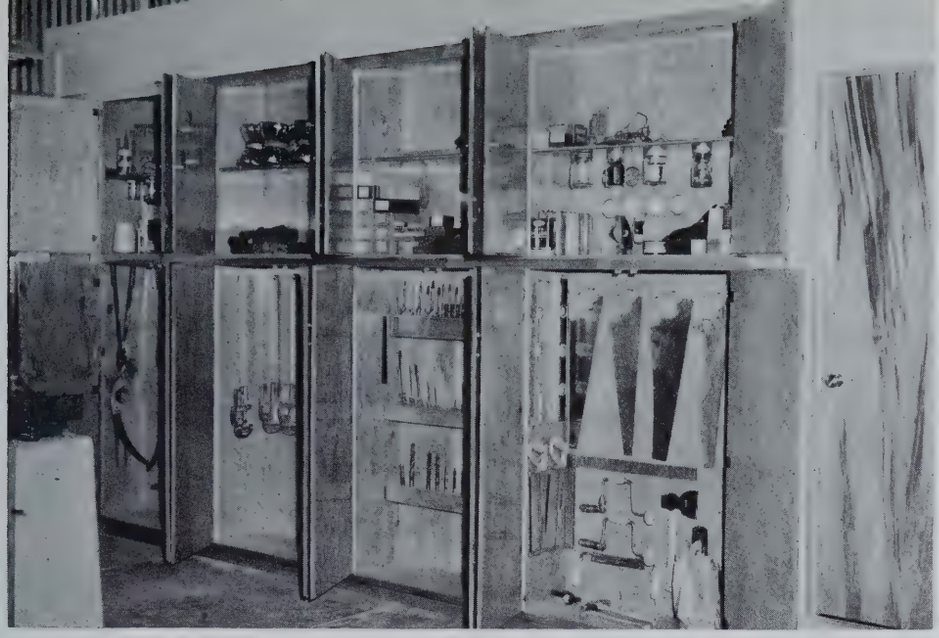
R. N. Jennings,
District Maintenance Engineer
District 7

The section warehouse at Eden was built in the mid-forties. It was a comparatively modern structure in a good state of repair, but did not present a very good appearance, did not provide adequate facilities for employees, and location of the gasoline pump prevented rapid servicing of vehicles.

The building was remodeled to overcome some of these shortcomings. Plat and photographs illustrate changes made.

The Eden maintenance warehouse, before being remodeled.

The same warehouse, with face lifting.

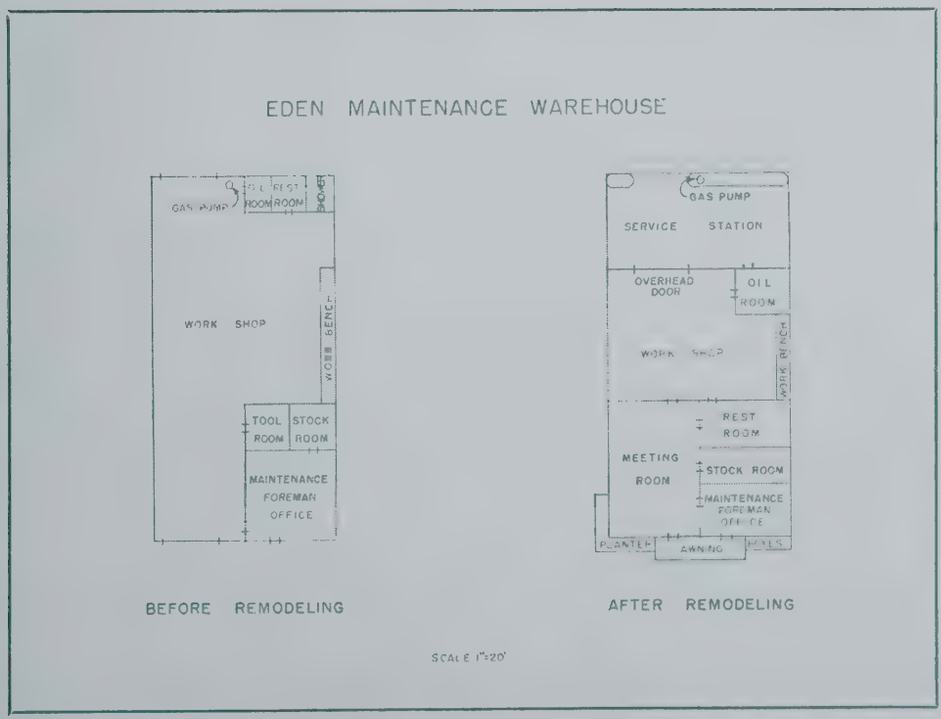


Small tool lockers keep tools handy, take up little space, and keep the place neat at all times.

The Maintenance Foreman's office was made smaller, but a large meeting room was added.

The meeting room is alongside the Maintenance Foreman's office.

This neat stockroom for small items is a part of the remodeled building.



The gas station was enlarged for better service.

Center Stripe Work

CUMULATIVE TOTAL OF CENTER STRIPE WORK PERFORMED BY DISTRICTS
AS OF AUGUST 31 , 1958
(COVERS 12 MONTHS BEGINNING SEPTEMBER 1)

DIST. NO	SALARY AND LABOR	EQUIPMENT RENTAL	MATERIALS USED	TOTAL COST	GALLONS OF PAINT USED PER MILE	TOTAL SOLID LINE MILEAGE	COST PER SOLID LINE MILE
1	$ 5,321.27	$ 2,831.21	$ 27,709.46	$ 35,861.94	14.89	622.31	$ 57.63
2	15,690.15	7,105.75	98,985.97	121,781.87	17.01	2,065.00	58.97
3	15,978.81	6,156.55	63,573.61	85,708.97	14.70	1,579.20	54.27
4	21,543.44	7,711.88	54,152.34	83,407.66	16.86	1,112.16	75.00
5	18,520.37	9,623.60	64,910.35	93,054.32	18.47	1,223.70	76.04
6	15,053.18	8,690.60	27,779.35	51,523.13	18.13	526.44	97.87
7	14,248.00	4,911.00	41,694.00	60,853.00	15.70	954.55	63.75
8	27,276.75	6,762.98	63,493.43	97,533.16	18.18	1,219.92	79.95
9	21,321.84	7,258.65	71,539.87	100,120.36	20.63	1,374.29	72.85
10	15,165.54	5,132.09	51,542.44	71,840.07	17.43	1,071.11	67.07
11	6,683.33	2,572.82	30,951.79	40,207.94	19.40	523.10	76.86
12	35,019.65	9,440.22	82,239.12	126,698.99	18.15	1,503.36	84.28
13	11,793.56	5,319.54	38,843.09	55,956.19	16.89	770.90	72.59
14	15,092.55	7,161.59	74,096.38	96,350.52	14.96	1,808.73	53.27
15	21,870.40	7,042.48	61,036.95	89,949.83	16.71	1,290.71	69.69
16	19,705.72	6,024.21	63,255.48	88,985.41	18.76	1,282.06	69.41
17	13,607.78	4,330.02	28,875.32	46,813.12	14.00	748.00	62.58
18	23,610.53	11,459.00	75,385.89	110,455.42	17.43	1,668.51	66.20
19	11,788.72	5,129.43	49,946.80	66,864.95	17.80	1,120.79	59.66
20	21,996.99	11,602.59	45,530.11	79,129.69	20.50	802.33	98.62
21	22,466.16	4,895.51	46,793.50	74,155.17	18.96	826.07	89.77
22	9,080.39	3,026.70	27,764.96	39,872.05	18.92	486.97	81.88
23	9,396.73	5,307.62	54,389.25	69,093.60	18.01	1,041.00	66.37
24	8,426.55	3,381.81	13,239.14	25,047.50	16.81	317.98	78.77
25	14,230.50	5,925.74	64,065.50	84,221.74	17.96	1,163.26	72.40
	$ 414,888.91	$ 158,803.59	$1,321,794.10	$1,895,486.60		$27,102.45	69.94
	22.00 %	8.00 %	70.00 %	100.00 %			

Compiled by File D-18

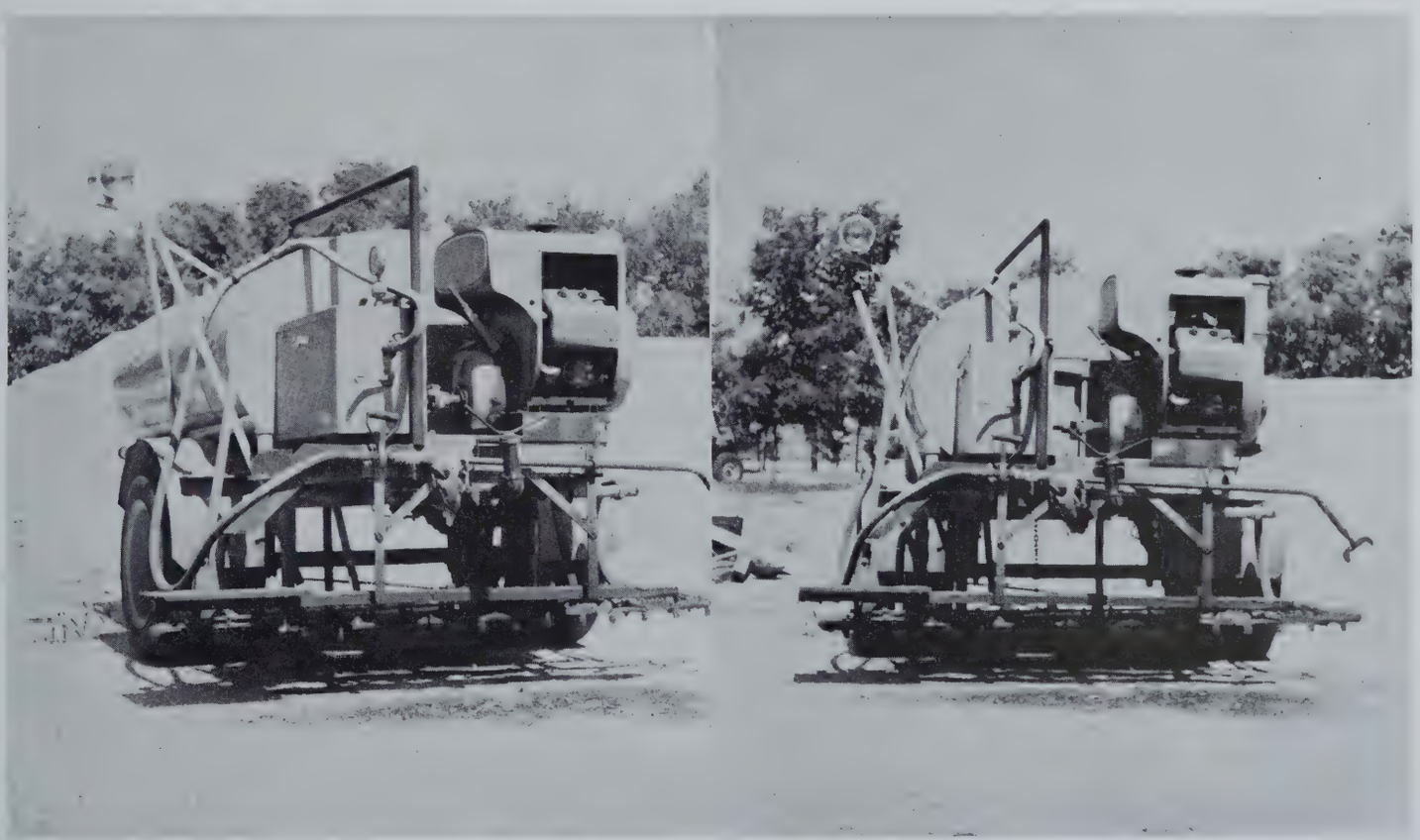
SAFETY LIGHT

Joel D. Willson, Senior Maintenance Superintendent
District 5

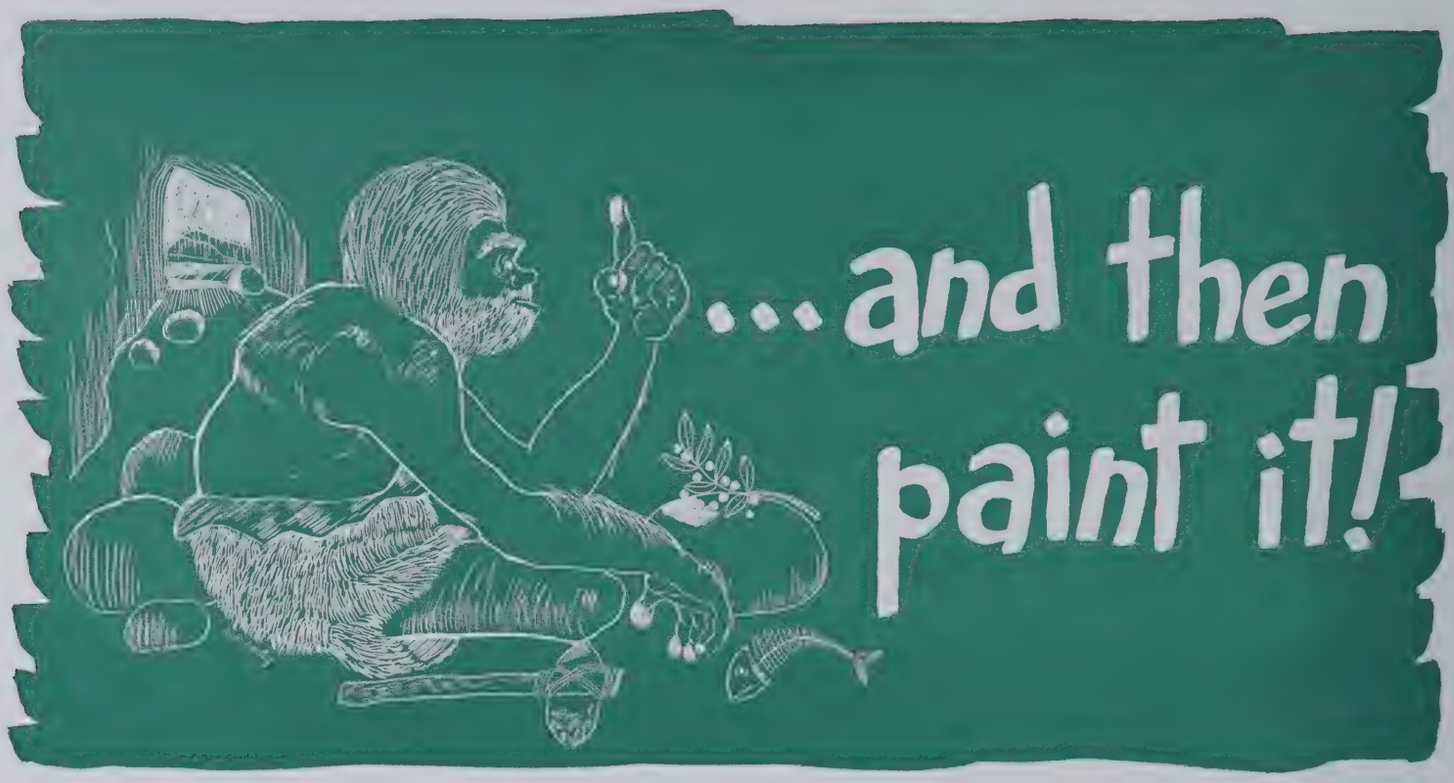
Ordinarily, on a job of sealing edges of asphalt pavement, the asphalt pot is followed closely by a truck spreading gravel. The raised bed of the gravel truck covers the blinker light on the truck cab so that it cannot be seen.

C. McMahan, Senior Maintenance Foreman at Muleshoe, and his crew developed an idea for safety on such a project. They obtained an amber, double-blinker light and mounted it high on the left side of their asphalt distributor. A wire with a connection for plugging into the tail-light circuit of the truck completed the installation.

They have found that with a blinker light mounted on the asphalt pot, traffic gives them a wide berth.



It would be hard to miss this blinker light mounted on the asphalt distributor. Before C. McMahan and crew came up with this idea, the light, on the truck cab, was covered by the raised bed of the truck.



A gallon of highway paint is a modern wonder, possessed of amazing strength and beauty. An ancient art, but now a science, its manufacture calls on extensive resources of Chemistry and Physics.

John E. Fryman, Senior Journalist, Information and Statistics Division

It probably began when Brother Neanderthal or one of his predecessors first squeezed a bright berry and found that the juice changed the color of his finger. Later on, he found he could grind bright stones to powder, mix them with water, and even change the color of the walls in his cave. This he did, each time becoming more proficient in mixing colors and making use of them.

Secret processes for mixing colors were passed from father to son, with later generations making their own formulas for various mixtures. Hundreds of liquid bases were discovered and improved upon with the passing centuries. As a result of this age-old process of discovery and improvement, modern paint manufacture has achieved the status of a highly technical and specialized science. Unceasingly, trained men and women pit their knowledge of chemistry and physics against the destructive forces of nature and mankind to make paints of increasing strength and beauty.

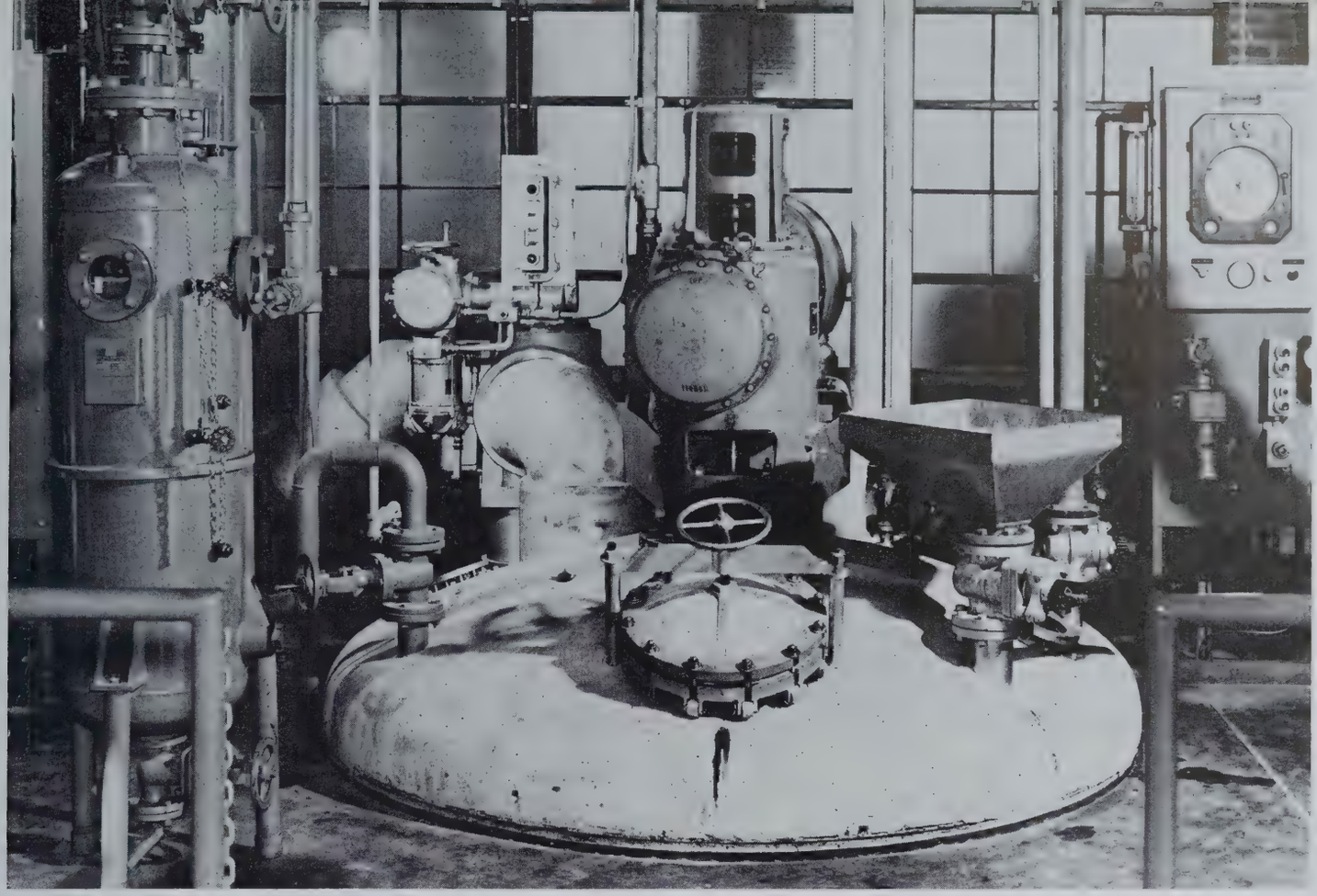
Paint, as we know it today, is used to protect and beautify almost every conceivable product of our technology. Modern highways are no exception. Since the first highway traffic stripe was applied 50 years ago, the use of paint in highway construction and maintenance has increased in importance and utilization.

The Highway Department, in 1957, used 437,500 gallons of paint—for bridges, traffic stripes, license plates, equipment, and in a thousand other of its far-flung activities. This total is broken down into the following categories:

Bridge Paint	54,000
Traffic Paint	350,000
License-plate Paint	20,000
Miscellaneous	13,500

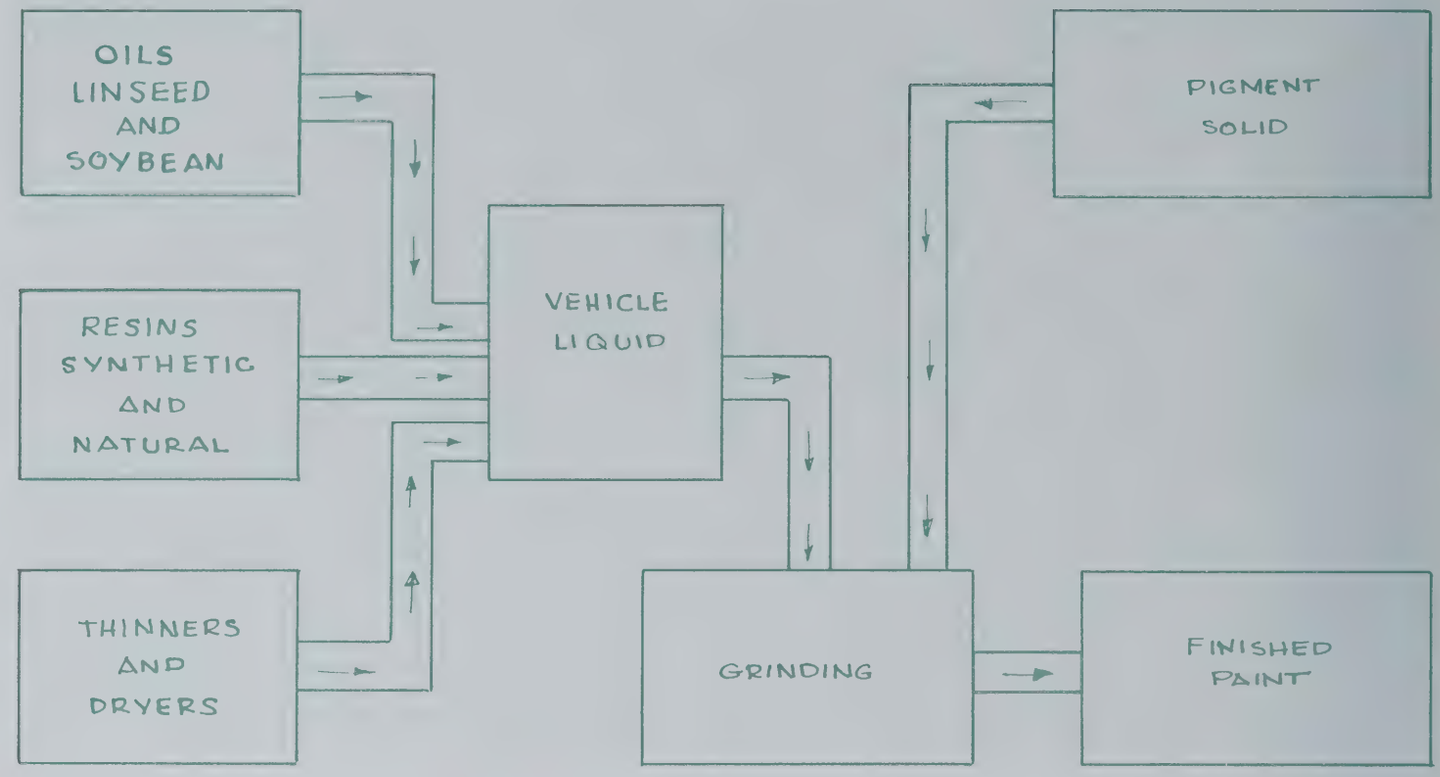
The Department uses paints that are manufactured by many different companies. Regularly, inspectors from the Materials and Tests Division visit these plants to insure that manufacturing is concurring with Department specifications.

TEXAS HIGHWAYS took advantage of the opportunity to accompany an inspector on one of these visits. Not only did we observe the quality control of the product, but also got



The first step in manufacture of most highway paint is the preparation and cooking of the alkyd vehicle. This large kettle, containing all ingredients for a typical vehicle, is heated to 480°F. and maintained at that temperature for nine hours. When cooking is completed the vehicle is similar to common varnish.

The vehicle is then piped through filters to thin-down tanks where naphtha and other liquids are added to adjust its viscosity. This step is the first of several thinning-down operations the paint goes through during manufacture.



a first-hand look at what goes into each gallon of highway paint.

Ever since that very first berry was squeezed, paint has been made of two general parts—the pigment (or coloring agent), and the vehicle (or liquid base). Pigments are finely ground particles, either vegetable or mineral, providing a specific color to the final preparation.

As illustrated, the vehicle is a complicated item. It is a liquid with the primary purpose of providing a solution for efficient distribution of pigment. Then, after a paint has been applied, the vehicle dries to form a hardened coating for adhering the pigment to a surface.

Several ingredients are compounded to make a vehicle. There are drying oils, such as linseed and soybean, to provide suitable film-forming qualities. Thinners and dryers are added to speed application and drying time. Finally, synthetic and natural resins are included to form a tough, lasting surface after application.

It has become a general rule to use synthetic resins instead of natural resins, since those from natural sources are expensive and difficult to find in abundant supply. Also, through synthetics, man has devised resins which possess many more of the qualities needed than are ordinarily found in natural sources. Because of certain chemical qualities, synthetic alkyd-type resins are usually preferred. This alkyd resin is made up of a polybasic acid such as phthalic anhydride, a polyhydric alcohol such as glycerin, and an oil such as linseed or soybean.

Located behind the plant and next to a railroad siding, these storage tanks maintain a constant supply of liquid raw materials, naphthas, and other liquids used in preparing the vehicle. All liquid transfer is accomplished by piping systems and pumps.

After preparation of the vehicle is complete, it is piped to these storage tanks, called a tank farm. Here the solution is maintained at a constant temperature until piped to the mixing plant.

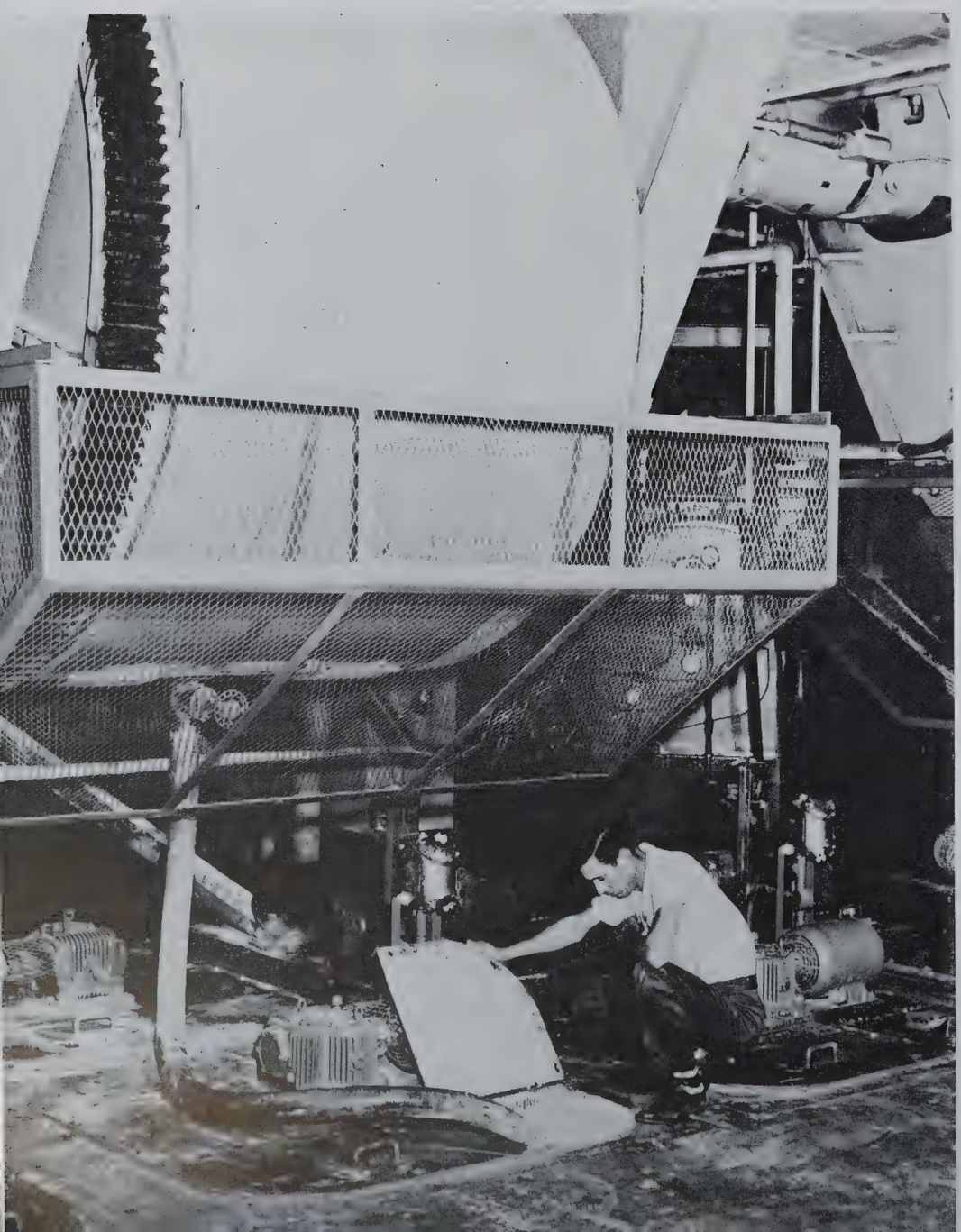
Throughout this plant, manufacturing relies heavily on piping and pumping systems. These pumps, located in the tank-farm building, speed the vehicle from storage tanks to different locations as needed in the mixing plant.

Raw materials are unloaded from freight cars directly into the mixing plant. These sacks of white pigment will be used in the manufacture of white center-stripe paint.

With efficiency and ease, fork-lift trucks move large quantities of pigment in the storage rooms and later onto the mixing-room floors.

On the top floor of the three-story mixing plant, vehicle and pigment are dispensed through a hopper to the grinding mill below. The vehicle comes directly by pipe from the tank farm.

Materials and Tests inspector Klebert Jacobson stands by to insure that specific proportions, as designated by the Department, are adhered to. Pigment is poured through hopper into the mill below.

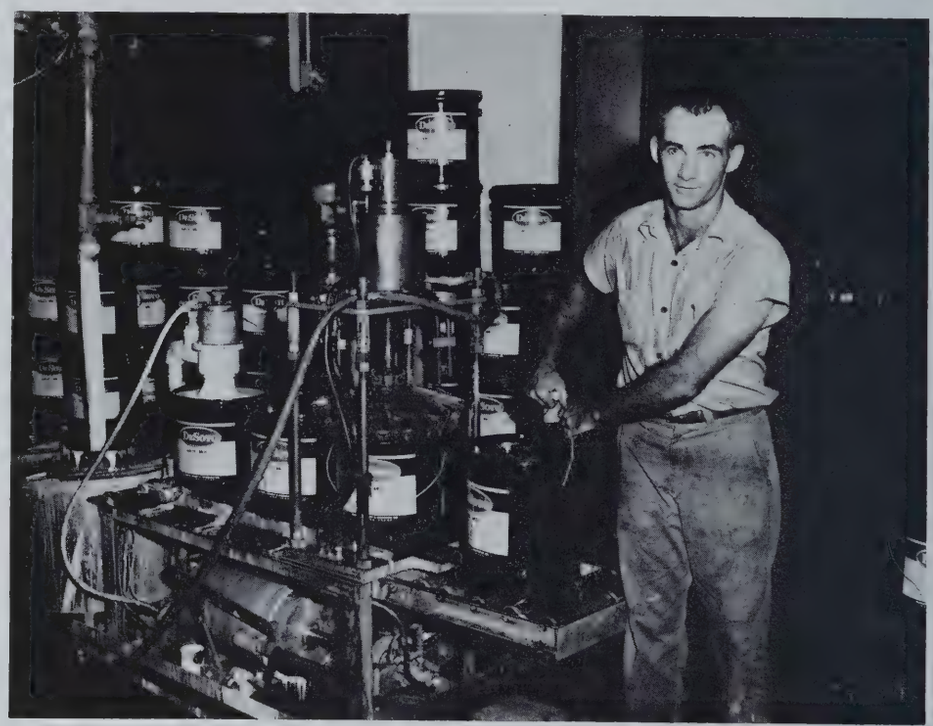


To provide a surface covering of adequate color and film strength, each individual particle of pigment must be coated with the vehicle. This pebble mill, so-called because it contains thousands of large ceramic pebbles, accomplishes this requirement. After the vehicle and pigment have been added from above, the drum is allowed to rotate for eighteen to twenty-four hours. During this time, the moving drum and pebbles grind pigment and vehicle together, eventually forming a suspension of pigment particles in the liquid vehicle.

At completion of grinding, the mill is drained into this thin-down tank in the floor below. The mixture is now called a dispersed base, and will again be mixed with naphtha and other thin-down liquids to attain final and proper viscosity and composition before packaging. Here, a plant foreman takes a sample to be tested in the company laboratory.

From the final thin-down tank, the sample is analyzed by company personnel and Materials and Tests inspector Jacobson. The operation shown is a drawdown which will determine the surface-hiding ability and drying time of the batch.

When the paint receives its final okay from the inspector, the batch is piped from the thin-down tank directly to the filling machines. On the left, highway paint is poured into a five-gallon can, receives a cap which is tightly pressed into place, and the can removed to a fork-lift which will take it to storage.



On the shipping platform, a load of highway paint awaits transfer to motor-freight trucks which will speed it to Highway Department maintenance warehouses. Samples from every batch are also forwarded to Austin where the Materials and Tests Division conducts more tests to insure that the paint will be suitable for highway use and conform to Department specifications.

OVER THE HIGHWAYS

Comments . . . from the Traveling Public

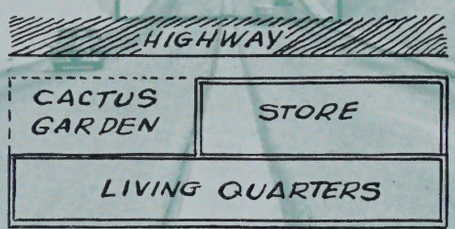
I recently passed through the great state of Texas. My visit was entirely enjoyable. The fact that you have an information and statistics division office at the main entrances to the state is very impressive.

The lady at the station near El Paso (The card that she gave me to mail back says "Attendant J.F.; District 29") gave me the best route to Houston.

I hope that you can help me with a problem which I have . . . related to that route. . . . After I left El Paso, I stopped at a little souvenir place beside the highway. While at the business establishment I bought some tiny arrowheads and a cactus. I also bought some small polished stones called "Indian Tears." The stones are small and are translucently black. Everyone who sees the stones wants some like them. But I don't have the name and address of the business place . . . east of El Paso some distance . . . out in the vast and beautiful land of the Lone Star State, all by itself.

If an officer would get the folks' address for me, I will send for some more small arrowheads and several dozen "Indian Tears." The lady would remember me: I am the man who bought the tiny green arrowhead out of her collection. If it proves impossible to find the place described above . . . I will draw a diagram showing, somewhat, how the place is laid out.

Burgess Howard
1510 21st S., N.W.,
Washington, D. C.



◈ *Let us know, too. We would like to send for some.*

I know that this is an unusual request but to us it is one of a family treasure. We moved from Lubbock, Texas, to Athens, Georgia, leaving Lubbock on August 7, taking Highway 82 all the way to Texarkana. Somewhere between Lubbock and New Boston, we lost a small box off our trailer. This box was ten inches by twelve inches by five inches and was cardboard with Frontier Hickory Smoked Sliced Bacon on the sides. It was raining at New Boston and the tarp was real tight and could not have lost off after then. This box contained two antique pistols (cap and ball). The serial numbers were 5476 and 25006. They have been in the family quite a long time. If it fell off of the trailer it would be on the south side of the highway. If it would be at all possible to ask the maintenance personnel to be on the lookout for this box, a reward will be given for their recovery. Your cooperation in the recovery of this box and its contents would be greatly appreciated. We were waiting till the van arrived to be sure that they were not on the van.

Yates C. Smith
Lubbock, Texas

As this letter was in the process of going to press, another letter was received from Mr. Smith. This letter proves that we do *get results.*

On about August 17, 1958, I wrote to you in regard to a lost parcel with two valuable guns, lost somewhere between Lubbock and New Boston. You notified the districts involved by letter D-18 dated August 22, 1958. I would like to report that they have been found and returned to me. I would like to thank you so much for the interest that you showed in this case for me. Please express my appreciation to the districts involved.

Even though I have moved from the State of Texas, I would like to let you know that of all the roadside parks we have seen, Texas again has something to brag about. They are tops.

Yates C. Smith
Atlanta, Georgia

To and From Our Readers

If anyone wants to go into the service-station business, this looks like a lucrative spot. The picture was sent in some time ago by F. M. Davis, District Engineer at San Antonio, and the sign at that time stood on F. M. 863 two miles south of Encinal. By now someone may have seen the crying need and erected a service station.

The Texas Coastal Bend Tourist Association came up with one answer to the humiliating problem Texans face today. On the back of each envelope they mail out is this message.

Mailed from ★TEXAS
SECOND LARGEST STATE IN THE UNION
Where ALASKANS should spend the Winter!!

About the Cover . . .

James F. "Flossy" Denham graces our cover this month, a representative of the maintenance forces honored in this issue.

Denham, of District 1, is a Semi-skilled Laborer with the Sulphur Springs maintenance warehouse. He has been with the Department for twelve years, all spent in Sulphur Springs.

Highway building takes teamwork, even as does the Saturday afternoon football thriller; and the maintenance man is similar to the player who takes the ball and carries it over the goal line for a touchdown. Someone else may have called the play, but the pride of carrying through belongs to the maintenance man.

As everyone knows who has ever traveled Texas highways, the job of the maintenance forces is a job well done.

"I'm Fezby, from Faraway County... we need a couple of valve cores and by the way... have the checks come in yet?"

TEXAS HIGHWAY COMMISSION

MARSHALL FORMBY	Chairman
HERBERT C. PETRY JR.	Member
CHARLES F. HAWN	Member
D. C. GREER	State Highway Engineer

Texas Highways

TEXAS HIGHWAYS, official journal of the Texas Highway Department, is published in the interest of highway development in Texas and for departmental education in the improvement of construction, maintenance, and operation.

All material and manuscripts should be directed to the Editorial Office, Division of Information and Statistics, Texas Highway Department, Austin 14, Texas.

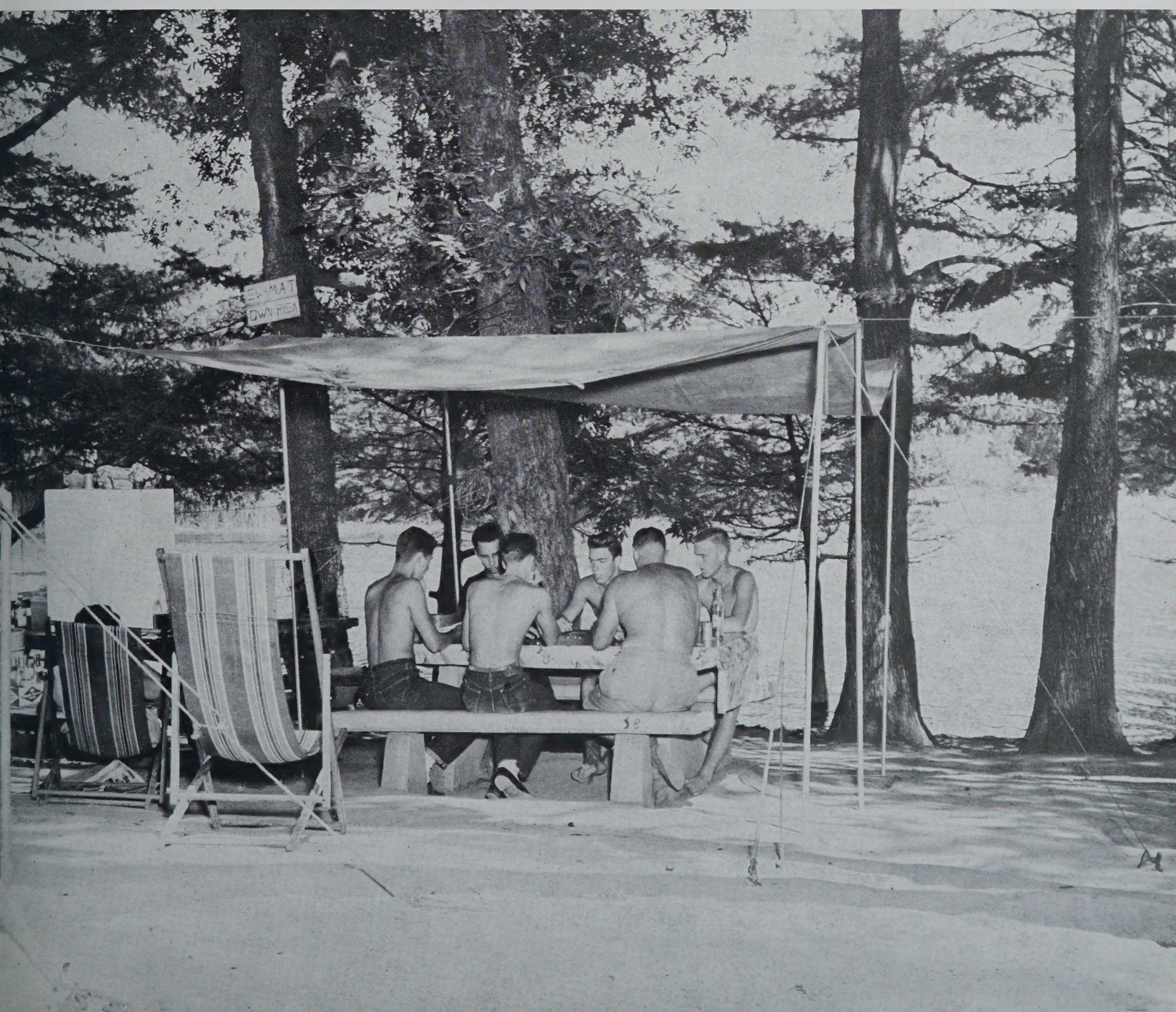
HIGHWAY SIDELIGHTS

Gordon K. Shearer, Director of Research
Texas State Parks Board

Favorite camping spot of Texas highway travelers is Garner State Park on U. S. Highway 83 at the Frio River. The park is named for Former Vice President John Nance Garner whose home is at Uvalde, near the park. In July of this year, 42,977 camping permits were issued in the state parks, and 24,059 of them were for camping in Garner State Park.

One reason for the high camping rate is the park's location on Texas longest highway, U. S. 83, which enters Texas at the Oklahoma border north of Perryton and runs to Brownsville on the Rio Grande. The park is easily accessible also from one of the principal East-West roads, U. S. 90.

A normal summer night finds every type of camper in Garner State Park, from the man who sleeps with a bedroll on the ground to occupants of the screened camping shelters. A steep, winding road in the park deters some trailer campers.

What is the most essential supply for a camper? "Ice," says Park Manager J. C. Henderson. More campers buy ice than any other commissary item.

Tent-shelter campers on Frio River.